

Address of
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"Nothing can be more certain than that the character and rapidity of our national development in all matters which relate to *industry, agriculture, public health* and the *preservation of the physical framework of our civilization* will be dependent upon the quantity and quality of sound research which is carried on. The truth of this assertion becomes even more apparent when one recognizes the fact that every modern nation stands in relation of industrial and commercial competition with other nations and in the measure in which this is true to fall behind the others in scientific development, is to *precipitate* a trend of events which spells national depression and disaster. In other words, the price of a sound, comprehensive national life is, in these times, widespread and intelligent scientific research." These are the words of Prof. Angell, the new president of the new Yale University. But President Angell stopped halfway.

Pasteur thought it through when he said:

"'In our century science is the soul of the prosperity of nations and the living source of all progress. Undoubtedly, the tiring daily discussions of politics seem to be our guide—empty appearances—what really leads us forward are a few scientific discoveries and their application.'"

But sound and comprehensive scientific research and a practical development of the application of the results and dis-

coveries of such research is impossible in any country, without an appreciative understanding of the truth of these two quotations by the peoples of that country, reflected in their educational system, their business development, their governmental guidance and, if necessary, control and supervision.

These two quotations express, in my opinion, the truest appreciation of the cause of the war and point out to us its chief lesson. But more than that, they throw upon your shoulders as chemists the great responsibility of seeing to it that that lesson is learned and applied by your respective states.

Public Trusts the Chemists

The reputation for honesty and disinterested truthfulness of the chemists of the three nations joined here today is so well established and recognized that only from your lips will the peoples of our different countries accept the truth of these propositions.

Economists like Hauser, Lord Moulton or Angell may thunder these truths. Historians, cold or imaginative, like Balfour, Wells, Irwin or Symons, may present in startling form their conclusions or prophecies, but a war weary world hesitates to adopt their conclusions.

You and you only do they trust, and progress and safety place the heavy responsibility upon you of making chemistry, its aims and possibilities, understood by public schools, high schools, universities and post-graduate schools, by industry and agriculture, and by the representatives of the people in municipality, state and nation.

The people of the United States are ninety-nine per cent. right at heart and appreciative; so are the people of England and of Canada. Their appreciation of chemistry must no longer be defined in the terminology of the propaganda of foreign hostile interests seeking only their destruction.

Your work must never again be allowed to cease in the laboratory.

The discovery and its application which today is only the latest proof of the truth of Pasteur and Angell occurred in 1856. In that year, your fellow Englishman, William Henry Perkin, aged eighteen, while engaged in scientific research in a laboratory in London, having for its object the artificial production of quinine, obtained a muddy, dark precipitate which, washed in alcohol, proved to be the dye we call mauve.

This discovery, with its principles, has been the basis for all

the subsequent development of the coal-tar industry and practically of all organic chemistry.

His efforts met English industries without understanding; met a public and a government without appreciation, and fellow chemists without a realization of the responsibilities of directing and enlightening English thought.

The German Hoffman put the discovery in his bag and took it back to Germany. Almost instantly, he, and he typifies his chemical successors, was able to make German industry, German universities and the German Government realize the importance of the contents of that bag.

A Triple Alliance

Immediate success led to a greater appreciation of an ever closer alliance of science and industry, and an ever closer alliance between science, industry and the militaristic state. This triple alliance changed Germany from an agricultural nation into the second industrial nation of the world, but in that change, it brought about a succession of periods of over-production, each one in turn overcome by greater consolidation, by ever increasing corruption in methods of bribery, espionage, dumping, et cetera, and by ever intensified state aid and direction.

In 1914, we find the German people demanding the control of the markets of the world. We find their hearts corrupted by the methods which they had felt it necessary to adopt to overcome their successive periods of over-production. We find them swollen with pride at their successes and ready to inspire or acquiesce in the hazard of battle. This triple alliance of industry, science and the militaristic state—and the evidence is overwhelming that each was equally guilty—considered that it would be quicker and cheaper to attempt to gain this end by victory on the field of battle, rather than to find increased markets for a surplus production by further intensified methods of peaceful penetration.

The same chemical research with its well-served industry had in turn well served the militaristic state. As chemical progress indexed commercial progress, so explosives had kept pace with dyes and pharmaceuticals, the ammunition factories of her peaceful penetration were the arsenals of her munitions preparation.

In the fall of 1913, the chemical application of Perkin's discovery was able to notify the war lord that Germany was ready; that she controlled 95 per cent of the organic chemistry

of the world upon which industry and the production of explosives were dependent; that she had crushed out every incipient effort toward the development of the Perkin discoveries by every other nation and was able to deal the dependent industries of those nations tremendous blows, and that now by the final triumph in the development of the Haber processes of making nitrates from the air, her agricultural production and munition production were safe from the menace of any blockade.

You know the rest.

All this German chemists accomplished not alone in their laboratories but in the forum of public opinion. They had educated and moulded thought in Germany until every man of whatever rank, in or out of industry, education or governmental service, realized the importance of chemistry in his life and in the life of his country.

World's Wealth Increased

They knew that the alliance of science and industry had increased the wealth of the world a thousand-fold in the past hundred years.

They knew that it was the life-blood of industry; they knew it was the safety of their state and the only sure foundation upon which to base the hope of the health of their children and their children's children, and they had impressed upon the world the discouraging and withering idea that the Germans and the Germans alone were mentally equipped to lead in this great age of chemistry.

You may answer me that I reproach you with results which could not have been foreseen, but I tell you that for three years I have been reading the records and the correspondence and the private papers of German chemists, German business men and German Imperial representatives, and I have been forced to realize that every result had been foreseen, realized, appreciated and worked for by every chemist in the German nation.

Just one or two instances: Prior to 1908, German patent laws contained the so-called working clause, by which your inventions, if patented in Germany, must be worked there within a certain period of time or they were thrown open to the German manufacturers and developers. Agitation was rife in this country that we should protect our future in like manner.

But by 1908 Germany had decided that she had so far

advanced in science that she no longer needed that clause to protect herself and that if enacted by the United States it would threaten her control of organic chemistry in the world and destroy the purposes upon which she was bent.

The president of the Bayer Chemical Company, at that time the head representative of this march for world control in America, although on paper an American citizen, acting under instructions from the consolidated government of chemical industries of Berlin, went to Commissioner Moore at the Patent Office in Washington. It was the beginning of one of Washington's hot summers. With fulsome praise of his outstanding position in the patent world and the great inventive genius of this country needing protection, he reproached him for not representing the United States at the International Patent Conference about to be held in Stockholm. Mr. Moore responded that the unenlightened Congress had not given him any funds with which to go. Mr. Moore then went on his vacation. Mr. Muurling, the predecessor of Schweitzer and Metz as the American voice of Germany's chemical interests, went to Robert Bacon, then Acting Secretary of State, drew the picture of the United States unrepresented at that great Conference, pointed out to him that he had a fund which he could apply to any purpose which he deemed for the best interests of the country in its foreign relations, with the result that Mr. Moore was recalled from his vacation and sent abroad; but with him went a letter to the German chemists, telling them that the American representative of the German dream had done his part and that they must now do theirs.

The German Patents

The result was that Moore was induced to go from Stockholm to Berlin, where he was fêted and dined by the Kaiser himself and returned to negotiate the Treaty of 1909 with Germany, by which Germany was released from ever working her chemical patents in this country and by which the last hope of development of organic chemistry in this country was crushed.

No more loyal Americans ever lived than Robert Bacon and Commissioner Moore, but they were unconscious tools in the hands of the German chemists, the handmaidens of the German dream of world control. And you were to blame, because you had not instructed your Government officials up to a realization of the importance of chemistry and its guidance and protection by the state.

When the war broke out in 1914, four billion dollars of

annual industry in this country, to say nothing of our physicians and hospitals, were dependent upon the will of the German Emperor as exercised through six importing firms and about four mere assembling plants. At the Kaiser's nod he summoned their assistance.

Listen! April 25, 1915, Boy-Ed writes to Albert:

"Very Honorable Privy Counsellor:

"Today's *World* prints the enclosed short article on the alleged erection of dye factories in New Jersey by Germans. In case you are not able to take any steps to prevent an undertaking of this kind, I am requesting you to indicate to whose attention I could call the matter.

"With greetings, etc.,

(Signed) Boy-Ed."

Albert answers, April 28, 1915:

"With regard to dyes, I got in touch with local experts in order to determine what truth there is in the news. According to my knowledge of things, the matter is a fake, inasmuch as our factories have bound themselves orally and by word of honor to do nothing in the present situation which might help the United States."

As a result, Bernstorff was able to cable his country that they had in their possession the weapon by which four million men in this country could be instantly thrown out of work, as an argument why America should attempt to force England to lift the blockade.

Drug Supply Cut Off

As a result, the German Government did issue an order, only to be met by a final realization of your own intrinsic ability. As a result, Germany was able to shut off as a further threat the supply of salvarsan and luminal from this country, which in her heartlessness she did, leaving thousands of epileptics and ten million syphilitics without any relief from the ravages of that plague and consequently menacing the other ninety millions of our people.

I could go on pointing out the results, but it is not necessary. But why dwell upon the errors of yesterday?

The situation is as acute today as it was in 1908, in 1910, in 1914, or in 1916 and 1917.

Yes, the war is over, but the situation is the same.

This was an industrial war, brought on by industrial Germany in her lust-mad haste to capture the markets of the world. Industrial Germany, in her arrogance and pride, preferred the formidable hazard of battle to the progressive and sure infiltration which within ten or twenty years might well have given her the whole domination she sought from complacent and unthinking people.

Her ambitions are the same today as they were in 1914. Her methods are the same in peace and war.

Through the most extraordinary coalition of Science, Industry and Government that the world ever saw, Germany in the past leaped leagues ahead of rival nations, and as she ran she found means to clog the feet of her competitors.

Rapidly recovering from the debilitation of war losses, Germany is once more driving ahead in this special and all-important field. Once more she plans to deceive her rivals as to the importance of this special key industry of chemical production. Again she tries to clog the feet of competitors.

Once more she sends her spies and agents to this country and reinspires Germans, camouflaged as Americans, to poison the well from which America should draw her full strength for peace or war. Can that be done successfully here and in England and France, Germany will be a menace to world peace within a decade.

It is our people, our statesmen she seeks to lull and benumb. Let her gain her end and she will have developed within ten years, from her experience in the Great War and through the magic of her doctors of chemical research, through her tremendous and closely welded chemical industry under government protection, from her intensified alliance of Science, Industry and Government, peace weapons and war weapons of potency unforeseeable.

A Mighty Weapon

We have in our grasp today the means to make the United States forever independent in peace and war. In our grasp are the essentials for the control of disease, for the vast increase of food production, for the immense development of domestic and foreign industries, for secure national defense. We have universities ready to supply us with the personnel to put us in the forefront in this chemical age.

Are we so unconcerned, so dully perceptionless, so stupidly asleep that we will permit German intrigue to stifle this price-

less acquisition, which has cost us millions of dollars and 27 per cent of our war casualties?

Do we think that we are at peace because our Government has formulated a set of words declaring that peace exists, and because our President has put his signature to the document? Fatal assumption!

With the German people, dominated by their ineradicable mania of superiority, the war has passed into another stage merely. But it is the same war, waged with new weapons.

All the defeats and punishment suffered by Germany from 1914 to 1918 were invaluable discipline and experience for continuing the indecisive struggle.

Germany was not conquered. She was merely stopped, thrown back for a time. She did not experience the agonies of invasion. Her people did not groan under the horrors that fell upon Belgium, France, Roumania and Russia. Never forget that the German people greeted the baffled German armies as the Romans were accustomed to salute the legions of victorious Cæsar.

The retiring hordes, flowing back into the Fatherland, were garlanded with flowers. The incidents of roadway and city square as the gray-green warriors fell back before the menace of Foch, Haig and Pershing cry with shouting tongues to thoughtful men. A subdued people, a people conscious of defeat, do not crown their unsuccessful legionaries with laurel and jasmine.

Their attitude shouts aloud the set purpose of the German mind to begin anew, patiently, devotedly, in the silence of their laboratories, their task of dominating a world so ridiculously inferior to themselves.

If this were mere speculation, I would waste neither your time nor my own; but my assertions are buttressed by timbers of hard fact.

In Germany today industrial reorganization for world domination first in the peaceful arts and then in war is proceeding mightily under the sympathetic eye and fostering care of a government which differs in no important particular, so far as the world outside of Germany is concerned, from the government of the Hohenzollerns. The German purpose stands forth as clearly as a mountain in the sunlight: First, reconquer in industry and commerce, then we Germans will see.

Their secret documents prove it. The heart of the news that comes out of Germany proves it. They prove it out of their own mouths.

Moles in the darkness, German agents in America are once

more plotting against our security, our prosperity and against the health of our very children. The German design to render the United States impotent is being prosecuted today with more subtle viciousness than marked the intrigue of Von Bernstorff, Dr. Albert and Hugo Schweitzer in the years before we entered the war.

A Time of Danger

The times are too tense with danger for passive tactics. On one side we have the same old crowd of German agents masquerading as good Americans. On another side we perceive American citizens supporting the German intrigues. In Congress we hear and stand aghast at the ignorant and malicious outbursts of certain legislators, unmindful of their country's welfare. Folly drips from their mouths. Stupid suspicion of the motives of honest men and appalling ignorance of the times mark their astounding incapacity. There are some who, like Jacob of old, have set themselves to steal the birthright of chemical independence from the American nation. They may disguise for a time the hairy hands of the German dye monopoly that controls them, but in the end the people will know them for what they are.

Their voices are the voices of elected Representatives and Senators in the American Congress, but the hands that manipulate them are the hands of the German Dye Trust, the most powerful monopoly ever formed by man, the *Interessen Gemeinschaft*, the "I. G."

Joseph Frederick Naumann, German economist, editor and member of the Reichstag, in the most successful and probably the ablest book that has appeared in Germany since the beginning of the war, "Central Europe," frankly admits this charge.

"The war," he says, "was really only a continuation of our previous life with other tools but based on the same methods. In this, indeed, lies the secret of success * * * if our opponents like to label this intrinsic connection between war and peace 'German militarism,' we can only regard this as reasonable, for Prussian military discipline influences us all in actual fact, from the captain of industry to the maker of earthworks. * * * Happen what will, the German spirit has received its baptism of fire; the national genius was and is a reality. Both to ourselves and to the outside world we have shown ourselves as in essence a single unit. Now it is our concern to carry through to its goal this essential German character, proved in the most

sinister of wars. This will and must be set on foot directly peace is concluded."

And a little further along:

"We shall enjoy our golden age as other conquering nations in other ages and with other abilities and excellence have done before us. Our epoch dawns when English capitalism has reached and overstepped its highest point, and we have been educated for this epoch by Frederick II, Kant, Scharnhorst, Siemens, Krupp, Bismarck, Bebel, Legien, Kirdorf and Ballin. Our dead have fallen on the field for the sake of our fatherland, Germany, foremost in the world."

Because the peculiar circumstances of my service to the United States gave me a most effective perspective of the German purpose of advancing German power while weakening American strength, I am driven to speak out. With the hope that this truth will stick fast in the national consciousness, I have the temerity to awake the lessons of the war and urge you to do your part toward awakening the American people before it is too late.

If, in the reaction of war and in the general distaste for discussing matters pertaining to war, we permit ourselves again to be lulled and numbed by German propaganda; if we look on indifferently while a few demagogues in Congress and a few shortsighted, selfish men in business life play the German game; if we allow Germany to stifle American industry that would within a very few years make the United States absolutely safe, then, I say, it will have been through your neglect and temerity and failure to realize that it is your responsibility not only to search the truth, but to preach it.

A Greater Responsibility

Your responsibility today is the same as it was during all these years of neglect, only intensified as it must be by your consciousness of the results of that neglect.

You alone in your town or village can see to it that these truths are realized by public school and high school; you alone in your state can see to it that these truths are realized by universities and state legislators in control of education.

You alone can see to it that in the National Government, your representatives in Patent Office, in Bureau of Education, in State Department and in Congress are kept abreast with your development and needs that every insidious attack is exposed and refuted.

You must be mindful of the fact that most of our school heads, our great editors, our government officials, both administrative and legislative, have been educated in what one of your English compatriots has called "Museums of Ancient Learning" and that the war has for the first time and but partially, opened their minds to a realization of the scientific progress of the last century and its true relation to national progress.

Are you awake? I do not think so, with the exception of a few. You have listened without apparent protest, contenting yourselves with resolutions and telegrams both good but not sufficient to contravert the German lie that there was a "Dye Monopoly" in this country, or that such a monopoly would result from the enactment of a selective embargo, when you knew that the development of a dye industry is synonymous with the development of education in organic chemistry and that no monopoly in education is possible without the compulsory partnership of industry, university and government, such as exists in Germany. (A monopoly which never worries those tools of German propaganda.)

You knew that Senator Frelinghuysen spoke the truth when he pledged his honor on the floor of the Senate that there were already forty-six independent dye concerns in his own state, and the Senators from this Empire State, when they find their voice, can stand up and say that there are twenty-nine more here.

Not a "Dye Fight"

I say you have heard it called a "dye fight," when you knew it was a fight of organic chemistry; when you knew that "dyes as dyes" do not in normal times constitute a gross business of more than \$40,000,000 a year, not as much as our children spend in toy balloons or our five and ten cent stores take in in a month.

You heard without audible resentment the German lie that the chemical foundation was another monopoly and had purchased for less than their value, patents belonging to the innocent men of Germany. You knew that no stockholder, trustee or president ever has or ever can make a penny out of the chemical foundation; that it was formed to represent the American people in their purchase of their freedom from the clutch of the hands seeking to misuse the beneficence of their laws to choke our industrial development, our means of defense, and our hope of the preservation and conservation of the health of our manhood and womanhood.

You know that the U. S. Constitution gave Congress power to issue patents in order to offer inducement to the publication of each successive discovery in science, in order that it may be made the stepping stone for future progress, and you know that practically all German patents were taken out with the intent to conceal and suppress advance in scientific information and what the foundation bought was useless, unless American business spent millions of dollars to find out the necessary information which the patents concealed.

You knew that the attack on the foundation was a German attempt to diminish the usefulness of the organization which they know will never quit until every man, woman and child in this land knows the whole hideous past chemical story and has a vision of the wondrous future of chemistry in the idealistic hands of the Anglo-Saxon race.

It was only freedom from blackmail and the consequences of imbibed German propaganda intended for our destruction that the foundation bought. All other nations accomplished the same result without any compensation to Germany.

What would they? Should the American Government give back to the Germany, which in 1915 attempted by the use of her patents to throw four million American citizens out of work, in order to blackmail our Government, the right to do so now for the purposes of her peace-time conquest of the world's markets?

Would you have the American Government hand back the patents covering the only weapon with which we can fight the dread scourge syphilis, to the country which once shut off our supply while we were at peace with her, to further her war-time purposes, without assurance greater than her word, greater than her scrap of paper assurance, that an attempt to use the same power would not again be made to accomplish some one of her aims?

Germany and Congress

Did it not bring to your minds the lessons of the war when you saw the importing representative of the German "I. G." stand on the floor of the House of Representatives, flanked by fifteen of the seventeen Congressmen who voted against the declaration of war, leading the cheering when the first great unsuccessful test came as to whether American chemists should be given a chance to catch up their neglect of forty years and atone for it by leading this country through the development of organic chemistry

into the realms of intensified national industrial progress, sweet security to home and child and blessed advance in the medical service of humanity? Do you not feel that the voices of two German importing firms were louder in protest and more persistent in their appeal for Germany than the voices of your fifteen thousand members for America's lessons of the war.

Again I repeat, Herman A. Metz stood upon the floor of the House as that vote was announced and shouted to a gallery of American citizens "I've got you licked." And when he screamed in triumph, he meant "I, the representative of the Interessen Gemeinschaft, the 'I. G.,' the combination of German Government and German chemical industries; I've licked the advice of your General Pershing; I've licked the advice of your Secretary of War; I've licked the advice of your Secretary of Navy; I've licked your President; I've licked your Administration; I've licked your thirty million dollars investment in your colleges; I've licked your chemistry in your high schools and your public schools; I've licked your research institutions and the future development of medicine in America."

Chemistry in the Colleges

Motives of politicians are questioned, interests in industries are antagonistic, but your heritage, the purity and spotlessness of your great white plume insure you attention and burdens you with the responsibility. Each in your own community must tell the story of chemistry to the Boy Scouts and the Rotary Clubs, the school boards and the public and high school teachers, the local editors, clergymen and physicians. You can point out how chemistry can serve each of your local industries, the agriculture of your community and the public health of your city; and more than all, you can meet and refute, not only the false ideas which have been inculcated in the past by German propaganda but each new lie which her system puts forth. The universities have already harkened to you. The study of man, his emotions and the tongues and learning of the dead past, last sanctuaries of lost causes, are already being forced into their proportionate place in the curricula, and the understanding by man of the world in which he lives and his relation to it is being given its proper importance. In this country, during the past year, over thirty millions of dollars have been appropriated by the different

universities to the promotion of the study of chemistry. For instance, Yale has appropriated three and one-half millions to build the finest laboratory in the world, and has also established chairs of research, whose occupants will be free from the labor of teaching. Harvard and Princeton are about to follow suit; Cornell has appropriated five hundred thousand dollars; so it is right straight across the country. I need only mention that great research institutions are springing up, such as the endowment in Leland Stanford, for research studies in the chemistry of foods and a great, as yet unnamed, philanthropist, is establishing a wonderful institution to insure in this country the proper research into the chemistry of plant life. This phase of the situation is most encouraging.

But most of our representatives in the executive and legislative branches of our States and of our nation are graduates of universities of the past, and their experience, as my experience, with chemistry and science in general, is as yet a closed book to them, and it is for you to supply to them the true information, to enable them not only to safeguard our progress by encouraging and fostering legislation, but also to prevent them from being influenced by information at the hands of your enemies.

To Eliminate War

You can tell them and they will believe you, at least 99 out of 100, for they are honest men, that your science is the life-blood of industry, eliminating waste and purifying the products of the soil, of the mine and of the factory. You can tell them that there has come into the world a realization that the empirical system of medicine has reached its limit, and that chemistry is ready to join hands with medicine and physics, in eliminating the waste of disease and in intensifying the vigor and strength of our people, and then you can talk to them about war.

They will not believe the imagination of a Wells or the prophecy of Will Irwin, but you know and can tell them that with twenty years of progress, if progress there is to be, by great and small nations of the world in the study and development of chemistry, *war will be unthinkable*.

The thrilling picture painted by Wells of the appalling destructive persistency of radio-active elements and of the awful hopelessness of defense against such forces, is as definitely prophetic as Jules Verne's vision of the submarine or Rudyard

Kipling's description of the swooping flight of the night mail flyer from London to Quebec. Inspiration of men of letters raised high above the weights of fear and superstition and dull habits that clog trammelled imagination lifts them to regions where they are fired by whispers of hidden things.

The creative chemist today is their blood brother in unappeasable imaginative effort. The world of his dreams is the scarcely touched sources of natural force, and the goal of achievement to which he has set his face as he toils against the heartbreaking road that all must tread who dream of benefitting the race, is the absolute mastery of man over nature. Wittingly they weave their webs and wittingly they set the snare that will some day catch the sun, as Wells puts it.

Our research chemists know as certainly as they comprehend the relationship of the molecules they take apart and put together, that human beings will not cease fighting each other and killing each other until the game is made too frightful for imagination to contemplate.

Ancient Pacifists

They do not believe that war can be stricken from the list of man's evil practices by appeals to his better nature or by reasoning with his intellect. For men have been slaying each other from anger or self interest since the time when the first hairy males hated the animal scent of each other, or coveted each others' females, or quarreled to a deadly finish over the raw flesh of a mammoth trapped in asphalt bogs. Even in that remote time, there must have been a few gentle souls, among the very old; among the few that had caught a gleam of the glory of life, who pleaded in strange, guttural eagerness for milder and more tolerant ways. Such doubtless were clubbed to death by their incensed sons, or driven from the fire to perish in exile. The clucking first men peace advocates of 20,000 years ago scarce daring to raise rude gutturals of protest against the murder and rapine done by their brute-like sons, were few and fearful creatures we surmise; but their kind has increased marvelously since mankind has learned through suffering of his own making to think more clearly than the brutes around him, and today there are millions of protestants against war where one dared to speak out a few centuries ago. The idea that war is a crime instead of a glorious sport has taken hold of peoples according to the degree of their experience and their intelligence.

The comprehension that it is nothing but an appalling

wastage of the toil of generations, that it is altogether brutalizing without a single compensatory side, is surely penetrating our thick minds. Bitter experience that the wastage and destruction of war is not confined to a period of warring but that they persist through miserable after years, is getting home to our understanding. The vast majority of human beings alive today would give thanks to the variously named Supreme Being, if they could but know that the legalized, wholesale murder called war was done for, finished. We are perfectly sure that this is so. Why, then, does not man end it once and for all? Why, knowing the better, does he continue to practice the worse in double guilt?

Perhaps we find an answer to this speculation in the tracery of the development of the peace idea. Put it squarely; peace advocates have multiplied and the peace idea has spread in singular relationship to the killing, searing, burning, mangling, poisoning, mass-destroying development of war weapons. As warfare has slowly grown more terrible, so men have turned slowly but in greater and greater numbers to peace hopes and peace plans.

Chemistry and War

As struggles between nations became more destructive, not only in actual warfare but in the paralyzing blows delivered to peace-time industry, more and more came to kneel at the altar of peace. When war science learned how to destroy thousands at a stroke, to ruin whole cities in the space of a breath drawn in the middle of the night, peace seemed more and more desirable.

As the researchers in the sciences contributed in ever-increasing frightfulness to the power and long distance application of war weapons, destroying all the romance of industrial combat and nullifying individual courage, men began to see increasing merit in the dreams of those who would abolish war utterly and who would police the evil doers of the earth as such are policed in our cities.

When the creative chemist showed military commanders how an opposing host could be stricken from life on the wings of the wind, laid horribly in death by a vapor as noiseless as the pinions of Azrael; how life could be expelled from great cities by a death dew of acids sprinkled from invisible airplanes, peace became a boon to be prayed for in utter sincerity. Hypocrisy smiling at gunpowder blanched before phosgene gas.

Peace is much more popular now that men know how to destroy each other with cotton in the form of nitrocellulose drawn from the air, than when they abolished each other with cellulose in the form of a club.

I do not say that the spread of education and gradual refinement of the spiritual side of man has not played a part in the growth of the ideal, nor that the operation of pure reason has not contributed to the vitality of the desire.

I do maintain with history at my back that successive inventions of horribly destructive weapons and successive demonstrations of the magnified and unpreventable ruin and misery wrought by one new weapon after another, have been successive shocks to man's long-time notions about the indispensability of war.

There was a time when he said that war could not be prevented. Then he began to say that it was disagreeable on the whole, that it ought to be prevented. Now he is beginning to see that it is so frightful that it *must* be prevented.

Until a day in April six years ago his dislike for war was never so intense as to make him pause to think deliberately before he plunged into it. Until April, 1915, his fears for his personal safety and for the safety of those he left at home was never so overpowering as to make him say "I dare not begin." Great guns and high explosives were terrible weapons but familiar ones. He knew something about them.

Fighting was a series of such small dangers, limited, instantaneous, each complete in itself, with no continuing or overhanging peril. Moreover, his own tremors were eased by the assurance that his loved ones were not in the same danger that he risked. His home was secure. He had something to go back to.

In other words, the element of safety in all wars previous to the great war closed in November, 1918, safety not only of combatant forces relatively, but of civilian populations actually, was large enough to reinforce the self-interest which prompted him to go to war in the first place. Always that self-interest, that determination to get by force what he had been unable to win in peaceful competition, overcame the constantly growing suggestion that war was a foolish, stupid business, entirely unworthy of his experience and his intelligence. He got hard knocks for several thousand years but these scarcely jarred his imagination.

All this time he had been fighting with understandable weapons, hurting his enemies with these familiar weapons or getting hurt by them. There was nothing mysterious about

it, nothing to daunt his imagination, stun all thought, fill the soul with dread or unthinkable disaster.

New Machines of War

As rapidly as his enemies found a new weapon he matched the invention with a similar one of his own or a better one. David's sling was the answer to the challenge of the club of the giant of Gath. The blunderbuss was the answer to the cross-bow, even as the Arabalest had overmatched the challenge of the Longbow. As time went on the long-barrelled rifle answered the blunderbuss, the highpower magazine rifle answered the muzzle loader and the machine gun took up the challenge of the magazine rifle.

Cannon that carries a high explosive shell 75 miles replied to the crude ordnance that was the last word in the gunnery of the Spanish-American war. Nitroglycerin and T. N. T. displaced gunpowder. The superdreadnaught of steel crowded from the sea the wooden frigate. Steadily warfare became more perilous, more unendurable, more impressive to imagination, but until the past few years, whatever its killing improvements, the sight and use of man-killing tools did not inspire us with horror.

Old-fashioned war weapons could be felt and seen and heard. They did not drop death upon us from four miles overhead or steal upon us to rob us of life while we slept. They did not freight the wind with danger. When they struck us or burst near us, that was the end of the blow or of the explosion. They did not turn corners to search us out with lung-searing poison or sink treacherously into holes and bide their time for days and weeks to set fire to our lungs or blind us. They were not invisible, inaudible. They were of the known world, changed a good deal from what our great-grandfathers and their great-grandfathers knew, but still recognizable as the traditional tools of war.

The Creative Chemist's Task

Then the creative chemist, taking a big step forward and making more intelligent use of atomic force, introduced into warfare weapons that could not be seen or heard, that impressed ordinary imagination as things not of this earth at all but of the pit itself.

He showed armies how to use poison gas to kill each other and more often to blind or burn or stupefy each other. He

introduced poison into the winds of the heavens and cunningly employed the winds to sweep destruction across wide areas. This new method of making war was the biggest jar ever suffered by our tradition-clinging minds. It was a method which struck at the mind in assaulting the body. Terror unfathomable was locked in it.

Inheritors of subconscious fears 200 centuries old, curious weaknesses of the spirit that 200 centuries have not been able altogether to eradicate. Fear of the dark, fear of the unknown, man stood appalled by this new weapon which worked frightful casualties without betraying itself by form or shape or color, without making a sound personal to itself.

It made him think of the future when the inept, unhappy gas contrivances would be so perfected, simplified, concentrated and increased in number and in destructive power, as to make the gas weapons of the Great War as clumsy by comparison as were the smooth-bore rifles of the Revolutionary War compared with the latest Thompson gun.

These things hit at the heart of imagination, surveying what creative chemistry has already done in war in its first few experimental steps. We stand back impressed as never before in the whole history of war tools. We are bound by sheer intelligence to comprehend that chemical science "has only begun to fight." It has learned how to utilize, not very skilfully, a few gasses. It has not done anything beyond small scale experimenting with radio active forces. But the lessons of the Great War were a tremendous impulse to the research chemist.

The creative chemist is searching out among rare elements, such as radium, arguments against warfare that can no more be refuted than pigmy man can oppose the tornado or the earthquake or contend with Vesuvius. The strange stuff that illuminates the dials of our watches may be the very medium that will eventually produce the resistless force that will make fighting intolerable.

Chemists are seeking through forces as yet imperfectly comprehended to turn man toward sanity. They are aiming at his imagination. Who will dare say they are pursuing a fruitless quest after the experience of the Great War which began as a war of great steel projectiles and ended as a war of invisible energy.

Hard headed military men, usually slow to convince that weapons other than the traditional arms of their service must be learned and relied upon, join nowadays with chemists in

an appeal to the public understanding which is little short of the striking appeal made by the imaginative story of Mr. Wells, for they realize that chemistry is merely on the brink of great things, and none see so clearly as they that chemistry aims to abolish war by making it desperately perilous to great nations as well as small, to governments as well as to the led peoples; to vainglorious politicians as well as to the obedient servants in uniform.

Wars of the Future

Gentlemen, I have tried to tell you that I believe that the Perkin discoveries of 1856 and their profane application in the hands of the Germans, precipitated the trend of events which spelled our late great disaster, and the disaster will recur again in some other form, unless we learn and preach the great lesson to be learned therefrom.

There is one incident which to my mind illustrates every phase of the disconnected thought which I have so poorly expressed to you. In 1906, Sir William Henry Perkin, after England had knighted him for the discovery, the application of which she had so sadly neglected and out of which her enemy was even then forging the weapons of her attempted destruction, came to this country to be present at our celebration of the fiftieth anniversary of his discovery. Medals, banquets, and honorary degrees were presented to him, and in response he said: "You have been so good to honor me by having this jubilee in remembrance of the part I have taken in connection with this coal-tar industry, and while I am thankful that I had to do with its foundation and early development, yet I feel that the part I have taken is indeed small when compared with the labors of the army of scientific men and others, both inside and outside the color works, who have advanced it to the present condition.

"However, it is very gratifying to me to receive all the general and kindly expressions of feeling you are manifesting, and I thank you very heartily. But, what have I that I have not received? It is not, therefore, for me to boast. I can only say in reference to the successes that have attended my efforts: 'Not unto me, O Lord, not unto me, but unto Thy great name be all the praise.'"

On that occasion—the shame of it as we look back on it now—the representative of the development of America's grasp of this discovery who addressed Dr. Perkin and presented the

testimonials which brought forth the answer I have quoted, was Dr. Hugo Schweitzer, a chemist, scientist and researcher, a German spy, secret service number 963,192,637, head of the German Secret Service in America, head of the system by which every effort to develop the organic chemical industry in this country was crushed out, head of the system of dye salesmen by which every fact and circumstance of the four million dollars a year American dependent industries was reported to Berlin, carded and charted there, taken into the great industrial establishment at Grosser Lichterfeld, outside of Berlin, and there placed at the disposal of competing German industry; the inventor of the idea of the purchase of the New York *Evening Mail* to corrupt our information; the inventor of the idea of the German Publication Society, formed to publish, for our delectation, the literature of German Kultur; head of the Chemical Exchange, by which all available phenol supply in America was turned away or made inaccessible to the Allies.

Dr. Albert, in praising him, said: "The breadth of high-mindedness with which you at that time (meaning the beginning of the war) immediately entered into the plan, has borne fruit as follows: One and a half million pounds of carbolic acid have been kept from the Allies. Out of this one and a half million pounds of carbolic acid, four and one-half million pounds of picric acid can be produced.

The Use of Bromine

"This tremendous quantity of explosive stuffs has been withheld from the Allies by your contract. In order to give one an idea of this enormous quantity, the following figures are of interest: Four million five hundred thousand pounds equals two thousand two hundred and fifty tons of explosives. A railroad freight car is loaded with twenty tons of explosives, the two thousand two hundred and fifty tons would, therefore, fill one hundred and twelve railway cars. A freight train with explosives consists chiefly of forty freight cars, so that the four million five hundred thousand pounds of explosives would fill three railroad trains with forty cars each.

"Now one should picture to himself what a military coup would be accomplished by an army leader if he should succeed in destroying three railroad trains of forty cars, containing four and a half million pounds of explosives. Of still greater and more beneficial effect is the support which you have afforded to the purchase of bromine. We have a well-

founded hope that we shall be in a position to buy up the total production of the country.

"Bromine, together with chloral, is used in making nitric gases, which are of such great importance in trench warfare. Without bromine these nitric gases are of slight effect; in connection with bromine, they are of terrible effect. Bromine is produced only in the United States and Germany."

This in the neutral country of the United States might well have cost the war and civilization. Thank God, Perkin died before he could see what civilization had done with his discovery.

Gentlemen, personal responsibility is a thing that cannot be escaped. Thinking so we may go to our graves, but there will come forth from the unforeseeable transmutations of destiny or from the Divine will, some reaction of our unconsidered acts or of our deliberate evasion of the moral law that may cause misery to a multitude.

Two years ago there leaned against a lamppost on the Bowery a stranger, with only his landlady's borrowed quarter in his pocket, only hate in his heart and wrong thinking in his head. Today, this man, Trotzky, controls the destinies and happiness of three hundred millions of Russian men, women and children. He, the mouthpiece of false ideas, seized upon the ignorant and desperate masses in the hour of their agony, and has proved their destruction.

Contrast his unwholesome and blasphemous career with that of Joan of Arc, who has always seemed so human, so natural, so close to all of us. Her sweet, simple girlish figure, sublime in her faith, sustained in her virtue and mighty in the power of her dominant will and the justice of her cause. She has been with us now for hundreds of years and never more so than during this war when she staunched the heart of France and led her brave as of old. As it is with these two individuals of humble origin, so it is with the richest.

Contrast the Emperor of Germany, in whom self-love and ambition had crushed out all spirituality, leading his people and forcing them on in the conquest which has brought such unspeakable misery and suffering to untold millions of men, women and children.

Contrast him, I say, with that magnificent figure, Cardinal Mercier, that soul of resistance to injustice and falsehood, whose memory constitutes a solace, stored up for the distressed people of all future times.

As it is with the lowly peasant man or woman, as it is with the emperor on his throne, or a prince of the church, so it

is with the scientist or the researcher. Contrast the influences intended by Perkin, who at the end of his life received his richly earned honors with bowed head and in humble voice, "What have I that I have not received? Not unto me, O Lord, not unto me, but unto Thy great name be all the praise."

A New Day Coming

Contrast him, I say, with Schweitzer, the scientist and researcher, representative of the profane application of his science in peace and war, and in the shadow of that contrast, and in the humility and in the shame which we should feel, let us look forward to the day when the English and American chemists can meet again, with the evidence about us of our atonement for our neglect, evidence of permanent peace in all the world, of a higher and more equal standard of living for all our peoples and of a great marching forward in our battle against disease. Until that day, let no man write his epitaph.

